Science

Exploding Pumpkin

Grade Level
2-8

Length of Lesson
50 minutes, split into two class periods

Objective
By the end of this lesson, students will have a better understanding of chemical reactions.

Materials Needed
- 1 cup of 20-40 volume Hydrogen Peroxide (6%-12% will work)
- 2 packets active dry yeast
- 6 tablespoons warm water
- 2 tablespoons of dish soap
- Cylinder or flask at least 500 ml
- Small mixing bowl
- Food coloring (optional)
- Large pumpkin carved as a jack-o'-lantern
- Funnel
- Safety goggles
- Gloves

Standards
NGSS
3-PS2-2; 5-PS1; MS-PS1

Lesson Summary
This lesson is designed for teachers to do as a demonstration for students. Students will learn about exothermic chemical reactions all while learning about pumpkins! If you are teaching a higher grade, this could be used as an inquiry experiment for students to complete in small groups.

**The hydrogen peroxide may not completely break down from the yeast and could cause irritation on the skin or eyes. Because this is an exothermic reaction, the foam will be very warm at first. Please use caution if your are having students complete this in small groups.

Suggested Sequence of Events:
1. Set up: Carve a pumpkin into a jack-o'-lantern with a simple face so the foam can easily spew out. Then set up your demonstration area with a table cloth set underneath your jack-o'-lantern for easy clean up.
2. Read "Pumpkin Jack" by Will Hubbell to snag student interest about pumpkins and jack-o'-lanterns.
3. Read through the AITC Pumpkin Ag Mag to learn more about the pumpkins! Interactive online versions can be found on our website.
4. Complete the activity following the procedures:
    - Carve a pumpkin jack-o'-lantern with a simple face so the foam can easily spew out.
    - Place the cylinder in the pumpkin and carefully add the dish soap and hydrogen peroxide. If you are using food coloring, add a couple drops into the dish soap.
    - In your small mixing bowl, mix your yeast packets with warm water for 30 seconds. It should be similar to the consistency of melted ice cream.
    - Pour the yeast solution into the cylinder in the pumpkin, step back, and watch the foam spew from the jack-o'-lantern!
    - All the materials are safe to drain, so simply rinse all the materials in the sink and compost the pumpkin.
4. Whole class discussion and reflection of activity.

TEACHER RESOURCES

Background Information:
When the yeast is added to the hydrogen peroxide, the yeast acts as a catalyst, quickly breaking down the hydrogen peroxide to oxygen gas and water. The bubbles form because of the reaction happening quickly and the oxygen then gets trapped by the dish soap bubbles which causes the foaming. This is an Exothermic Reaction and will cause the foam to be warm.

Extension Ideas:

- Watch this video as an introduction or demonstration of the activity. Available at http://iaitc.co/explode.
- Read "Pick a Pumpkin" by Patricia Toht. Dig deeper and learn about where the tradition of carving pumpkins came from.
- Learn about the growth of pumpkins and label a pumpkin diagram or model.
- Have students research the prefix and suffix of the term 'exothermic' and have them come up with a definition of that kind of reaction.
- Have students use our AITC scientific inquiry worksheet and test different variables. What would change the outcome of the foam?
- Where are pumpkins grown? Research geographical locations of pumpkin farmers in the United States and around the world.
    - Did you know that Morton, Illinois, is the Pumpkin Capital of the world? Learn more about Morton pumpkins and what they're grown for.
- Have a 'gourd' time and research other vegetables that are related to pumpkins.
- Squash Bees are very important pollinators for pumpkins! Learn more about squash bees and the process of pollination. Why is it important to protect pollinators? What other agricultural commodities rely on pollinators?
- Learn more about recipes that pumpkins are used for.
- Invite a pumpkin farmer into the classroom to talk about what it takes to grow pumpkins! Have your students prepare questions to ask.
- Take your class to a pumpkin patch to pick out their own pumpkins. Have them take the pumpkins home or paint them for classroom decorations!
- Learn more about yeast-is it alive?
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!